Amendments to the Claims

The following listing of claims replaces all prior versions, and listings, of claims in the application:

1.   (currently amended) A computer implemented method for emulating execution of legacy instructions, where said legacy instructions have instruction addresses, comprising:

      accessing blocks of said legacy instructions, said blocks having block addresses,

      storing translations, into a translation store, ~~translation information~~ for each of the legacy instructions,

      storing translation indications, for indicating translated blocks, into an indexing table at block numbers determined by said block addresses, said storing translation indications using a subset of block address digits whereby block numbers in said table are the same for multiple different blocks,

      executing translated instructions to emulate said legacy instructions,

      where for each of the legacy instructions ~~for each particular legacy instruction~~ of a translated block having a ~~particular~~ block number in said table, said storing translations step includes translating the ~~particular~~ legacy instruction into one or more translated instructions for emulating the ~~particular~~ legacy instruction, and

            ~~if the particular legacy instruction is a store instruction, to check the indications in said table for said particular block number to determine if instruction data has been stored for said particular block number;~~

          ~~if instruction data has been stored for said particular block number, to check said translation store to determine if instruction data has been modified; and otherwise, if instruction data has not been stored for said particular block number, to bypass said checking.~~

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22   if the legacy instruction is not a store instruction, going to said step of

23   executing translated instructions,

24   if the legacy instruction is a store instruction, where the store instruction

25   stores to a particular block with a particular block number in said

26   table, checking the indications in said table for the particular block

27   number, and,

28   if the indications indicate that said particular block has not

29   been translated, going to said step of executing

30   translated instructions,

31   if the indications indicate that said particular block has been

32   translated, checking said translation store to determine

33   if legacy instruction data has been modified and if

34   modified, repeating the step of translating the legacy

35   instructions and going to said step of executing

36   translated instructions; and otherwise, if legacy

37   instruction data has not been modified, going to said

38   step of executing translated instructions.

1   2.   (original) The method of Claim 1 wherein said step of storing translation indications stores

2   indications for only a subset of all the translated blocks.

1   3.   (original) The method of Claim 2 wherein said subset of all the translated blocks is stored in a

2   cache.

1   4.   (canceled).

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1　　5.　(currently amended) The method of Claim _1_ [[4]] wherein said block address digits are
2　　included in a three digit hexadecimal address field and said subset of block address digits is the
3　　center digit.

1　　6.　(original) The method of Claim 1 wherein said legacy instructions are for a legacy system having
2　　a S/390 architecture.

1　　7.　(original) The method of Claim 1 wherein said legacy instructions are object code instructions
2　　compiled/assembled for a legacy architecture.

1　　8.　(original) The method of Claim 1 wherein said legacy instructions include store instructions for
2　　modifying instruction code.

1　　9.　(original) The method of Claim 1 wherein said translation indications include a state field for
2　　each block number indicating whether the block represented by said block number has been
3　　modified.

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1   10.   (currently amended) The method of Claim 1 wherein,

2   ~~said step of storing translation indications stores indications for only a subset of all the~~

3   ~~translated blocks and uses a subset of block address digits whereby block numbers~~

4   ~~in said table are the same for multiple different blocks,~~

5   said subset of all the translated blocks is stored in a cache,

6   said translation indications include a state field storing a count for each block number

7   indicating whether the block represented by said block number has been modified,

8   said count in a state field is incremented each time a block represented by said block number

9   has been modified in said cache,

10   said count in a state field is decremented each time a block represented by said block number

11   has been removed from said cache,

12   said ~~bypassing said~~ <u>step of</u> checking ~~step~~ <u>said translation store</u> occurs only when said count

13   is zero.

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1   11. (currently amended) A computer implemented method for dynamic emulation of object code

2   legacy instructions, where the legacy instructions have instruction addresses determined by

3   compilation/assembly of source code and where the legacy instructions include self-modifying store

4   instructions for modifying instruction code, comprising:

5   accessing blocks of said legacy instructions, said blocks having block addresses,

6   storing translations, into a translation store ~~translation information~~, for each of the legacy

7   instructions,

8   storing translation indications, for only a subset of all the translated blocks, into an indexing

9   table at block numbers determined by said block addresses, said storing translation

10   indications,

11   using a subset of block address digits whereby block numbers in said table

12   are the same for multiple different blocks,

13   including a state field storing a count for each block number indicating

14   whether the block represented by said block number has been

15   modified by self-modifying store instructions,

16   executing translated instructions to emulate said legacy instructions,

17   where for each ~~particular~~ of the legacy instructions of said subset of all the translated blocks

18   having a ~~particular~~ block number in said table,

19   said storing translations step includes translating the ~~particular~~ legacy

20   instruction into one or more translated instructions for emulating the

21   ~~particular~~ legacy instruction,

22   storing said translated instructions in a cache,

23   if the legacy instruction is not a store instruction, going to said step of

24   executing translated instructions,

25   if the ~~particular~~ legacy instruction is a store instruction, where the store

26   instruction stores to a particular block with a particular block number

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27 in said table, checking the indications in said table for said particular

28 block number ~~to determine if instruction data has been stored for~~

29 ~~particular block number, if~~ and,

30 if the ~~instruction data has been stored for~~ indications indicate

31 that said particular block number has not been

32 translated, going to said step of executing translated

33 instructions,

34 if the indications indicate that said particular block number

35 has been translated, checking said translation store to

36 determine if legacy instruction data has been modified

37 and if modified, repeating the step of translating the

38 legacy instructions and going to said step of executing

39 translated instructions; and otherwise, if instruction

40 data has not been ~~stored for said particular block~~

41 ~~number, bypassing said checking.~~ modified, going to

42 said step of executing translated instructions.

1   12. (currently amended) The method of Claim 11 wherein said count in a state field is incremented

2 each time a block represented by said block number has been modified in said cache, said count in

3 a state field is decremented each time a block represented by said block number has been removed

4 from said cache, said ~~bypassing said~~ step of checking ~~step~~ said translation store occurs only when

5 said count is zero.

1   13. (original) The method of Claim 11 wherein said legacy code is compiled/assembled for a native

2 architecture and executes as a guest on a host architecture.

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1   14.   (original) The method of Claim 13 wherein the native architecture employs CISC instructions
2   and the host architecture employs RISC instructions.

1   15.   (currently amended) A computer system for emulating execution of legacy instructions, where
2   said legacy instructions have instruction addresses, comprising:
3   a group access unit for accessing blocks of said legacy instructions, said blocks having block
4   addresses,
5   a translator for translating the legacy instructions to form translated instructions,
6   a translation store for storing translation information for each of the translated legacy
7   instructions,
8   an execution unit for executing said translated instructions to emulate said legacy
9   instructions,
10   an index table for storing translation indications [[,]] for indicating translated blocks at block
11   numbers determined by said block addresses, said index table storing translation
12   indications using a subset of block address digits whereby block numbers in said
13   table are the same for multiple different blocks,
14   where for each particular of the legacy instructions of a translated block having a particular
15   block number in said table, said translation store includes one or more translated
16   instructions for emulating the legacy instruction, and,
17   to translate the particular legacy instruction into one or more translated
18   instructions for emulating the particular legacy instruction;
19   if the legacy instruction is not a store instruction, the computer system goes
20   to the execution unit for executing said translated instructions,
21   if the particular legacy instruction is a store instruction, to check where the
22   store instruction stores to a particular block with a particular block

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23   number in said table, the computer system checks the indications in

24   said table for said particular block number ~~to determine if instruction~~

25   ~~data has been stored for said particular block number~~, and,

26   if the indications indicate that ~~if instruction data has been~~

27   ~~stored for~~ said particular block ~~number,~~ has not been

28   translated, the computer system goes to the execution

29   unit for executing said translated instructions,

30   if the indications indicate that said particular block ~~to check~~

31   has not been translated, said translation store is

32   checked to determine if instruction data has been

33   modified and, if modified, the translator repeats

34   translating the legacy instructions and the computer

35   system goes to the execution unit for executing said

36   translated instructions; and otherwise, if instruction

37   data has not been ~~stored for said particular block~~

38   ~~number, to bypass said checking~~ modified, the

39   computer system goes to the execution unit for

40   executing said translated instructions.

1   16.   (original) The system of Claim 15 wherein said index table stores indications for only a subset

2   of all the translated blocks.

1   17.   (original) The system of Claim 16 including a cache and wherein said subset of all the

2   translated blocks is stored in said cache.

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18. (canceled).

1   19. (currently amended) The system of Claim ~~18~~ <u>15</u> wherein said block address digits are included

2   in a three digit hexadecimal address field and said subset of block address digits is the center digit.

1   20. (original) The system of Claim 15 wherein said legacy instructions are for a legacy system

2   having a S/390 architecture.

1   21. (original) The system of Claim 15 wherein said legacy instructions are object code instructions

2   compiled/assembled for a legacy architecture.

1   22. (original) The system of Claim 15 wherein said legacy instructions include store instructions

2   for modifying instruction code.

1   23. (original) The system of Claim 15 wherein said index table includes a state field for each block

2   number indicating whether the block represented by said block number has been modified.

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1   24.   (currently amended) The system of Claim 15 wherein,

2   ~~said index table stores indications for only a subset of all the translated blocks and uses a~~

3   ~~subset of block address digits whereby block numbers in said table are the same for~~

4   ~~multiple different blocks,~~

5   ~~said subset of all the translated blocks,~~

6   said system includes a cache for storing said subset of all the translated blocks,

7   said index table includes a state field storing a count for each block number indicating

8   whether the block represented by said block number has been modified,

9   said count in a state field is incremented each time a block represented by said block number

10   has been modified in said cache,

11   said count in a state field is decremented each time a block represented by said block number

12   has been removed from said cache,

13   said ~~bypassing of said checking occurs~~ translation store is checked only when said count is

14   zero.

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1 25. (currently amended) A computer system for dynamic emulation of object code legacy

2 instructions, where the legacy instructions have instruction addresses determined by

3 compilation/assembly of source code and where the legacy instructions include self-modifying store

4 instructions for modifying instruction code, comprising:

5   a group access unit for accessing blocks of said legacy instructions, said blocks having block

6   addresses,

7   ~~storing into~~ a translation store for storing translation information for each of the legacy

8   instructions,

9   an index table for storing translation indications, for only a subset of all the translated blocks

10   at block numbers determined by said block addresses, said index table storing

11   translation indications,

12   using a subset of block address digits whereby block numbers in said table

13   are the same for multiple different blocks,

14   and including a state field storing a count for each block number indicating

15   whether the block represented by said block number has been

16   modified by self-modifying store instructions,

17   a cache for storing translated instructions,

18   an execution unit for executing said translated instructions to emulate said legacy

19   instructions,

20   a legacy code translator operating, for each ~~particular~~ of the legacy ~~instruction~~ instructions

21   of said subset of all the translated blocks having a ~~particular~~ block number in said

22   table,

23   to translate the ~~particular~~ legacy instruction into one or more translated

24   instructions for emulating the ~~particular~~ legacy instruction,

25   ~~To~~ to store said translated instructions in ~~a~~ the cache and,

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26   if the legacy instruction is not a store instruction, the computer system goes

27   to said execution unit for executing said translated instructions,

28   if the ~~particular~~ legacy instruction is a store instruction, ~~to check~~ where the

29   store instruction stores to a particular block with a particular block

30   number in said table, the computer system checks the indications in

31   said table for said particular block number ~~to determine if instruction~~

32   ~~data has been stored for said particular block number~~ and,

33   if the indications indicate that ~~if instruction data has been~~

34   ~~stored for~~ said particular block ~~number,~~ has not been

35   translated, the computer system goes to said execution

36   unit for executing said translated instructions,

37   if the indications indicate that said particular block ~~checking~~

38   ~~said translation store~~ has been translated, the

39   computer system checks to determine if instruction

40   data has been modified; and if modified, the computer

41   system goes to said translator to repeat operating to

42   translate the legacy instructions into one or more

43   translated instructions and the computer system goes

44   to said execution unit for executing said translated

45   instructions; and otherwise, if instruction data has not

46   been modified ~~stored for said particular block number,~~

47   to bypass said checking and go to said execution unit

48   for executing said translated instructions.

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1　26.　(currently amended) The system of Claim 25 wherein said count in a state field is incremented
2　each time a block represented by said block number has been modified in said cache, said count in
3　a state field is decremented each time a block represented by said block number has been removed
4　from said cache, said bypass said checking ~~step~~ occurs only when said count is zero.

1　27.　(original) The system of Claim 25 wherein said legacy code is compiled/assembled for a native
2　architecture and executes as a guest on a host architecture.

1　28.　(original) The system of Claim 27 wherein the native architecture employs CISC instructions
2　and the host architecture employs RISC instructions.

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